

Provincetown, Mass., fourteen were driven ashore on the northwest side of the harbor by the ice field under the force of the high winds. With the high spring tides and timely assistance of the revenue cutter *Algonquin* and the tug *Peter B. Bradley* the stranded vessels were floated without great damage. Ample and timely warnings of the approach of the storm were issued.—*J. W. Smith, District Forecaster.*

WEST GULF FORECAST DISTRICT.

No marked disturbance passed over this district during March. Brisk to high winds, for which warnings were issued, occurred along the Texas coast on a few dates. Frost, for which warnings were issued, occurred over the northwestern portion of the district on the 28th and 29th.—*I. M. Cline, District Forecaster.*

CENTRAL FORECAST DISTRICT.

March was remarkable for the abnormally high temperatures that prevailed during nearly the entire month, there being but two or three days when freezing temperature occurred, and about an equal number when the temperature was but slightly above normal. There were no severe storms during the month, and no cold-wave or special warnings were issued. There were only four rain periods—7th to 9th; 17th to 19th; 20th and 21st, and the 29th.—*F. J. Wals, District Forecaster.*

NORTH-CENTRAL FORECAST DISTRICT.

The temperature continued moderate with only slight interruption, and consequently no general cold-wave warning was issued. The only severe storm which passed over the district during the entire month was one which advanced from the Pacific over the middle Rockies, and reached the Lake region on the morning of the 3d. Advisory messages were sent in advance of the storm to all Lake transportation companies that maintained winter navigation. Advisory messages were also sent to open ports in advance of a few other storms of less importance. The wind movement was far below the March average, and no accidents or wrecks were reported on Lake Michigan.—*H. J. Cox, Professor and District Forecaster.*

ROCKY MOUNTAIN FORECAST DISTRICT.

There was a notable absence of cold waves, and practically no low temperatures occurred in the district during the month. Cloudy weather was a feature with an excess of precipitation in Colorado, Utah, Arizona, and New Mexico. In Arizona the precipitation exceeded the previous record for March.—*F. H. Brandenburg, District Forecaster.*

NORTH PACIFIC FORECAST DISTRICT.

The month in the North Pacific States was mild and pleasant up to and including the 11th, when a period of stormy, disagreeable weather set in and continued almost without interruption until the close of the month. From the 18th to the 25th a succession of storms moved eastward near the International Boundary Line, each of which caused gales along the Oregon and Washington coasts, and, in one or two instances, severe squally winds in the interior districts. Unusually severe were the storms of the 20th, 23d, and 25th. At the mouth of the Columbia River the wind reached a maximum velocity of 78 miles an hour from the southeast on the morning of the 20th, and on the 23d and 25th the maximum velocity at the North Head station was 72 miles from the southeast and south, respectively. At Tatoosh Island a gale of 60 miles an hour from the southwest occurred on the 25th. Storm warnings were displayed well in advance of all storms.

Sharp frosts, injurious to early fruit and tender vegetation, occurred generally throughout the district on the morning of the 30th. Frost warnings were sent to all stations on the morning of the 29th.—*A. B. Wollaber, Acting District Forecaster.*

SOUTH PACIFIC FORECAST DISTRICT.

The month was one of unusually heavy rainfall in the southern part of the State. For a number of months back attention has been called to the abnormal conditions prevailing in the southwestern portion of the United States. Unusual

rains, noticeable as far back as last August, have continued in Arizona, New Mexico, and southeastern California, and probably in the northwestern states of Mexico. The forecaster has been aware of this abnormal condition; and forecasts of rain, showers, and thunderstorms have been made on every occasion when there was an indication of a depression over the Valley of the Colorado or the northern half of Lower California. The history of the season's forecasting shows a good understanding of the abnormal condition. Emphasis is laid upon this because in southern California some attention has been given in the public press to the claims of a so-called rain maker. This individual claimed to be able to make rain, using certain small evaporating pans and chemicals. Lately his claims have changed from "rain making" to "rain coaxing", and quite recently he has attempted forecasting the weather. His claims and work are not to be taken seriously, but the notoriety achieved illustrates how much is still to be done in the matter of educating the public in meteorology.

On March 11 a depression of some depth and large area moved southward along the coast. Rain fell from San Diego to Eureka, with high southeast winds. At Point Reyes on March 12 the wind reached a maximum velocity of 90 miles; at the Farallons a maximum velocity of 75 miles was recorded. Southeast storm warnings were displayed in ample time. In all, this storm of March 12 was one of the severest of the season. The pressure at Eureka was as low as 29.18 inches.

The entire second decade of the month was stormy. The rather unusual occurrence of storm warnings flying from San Diego to Eureka was noted on more than one occasion.

On March 28 a storm of some severity appeared on the coast and several squalls of marked severity were reported in the San Francisco Bay district. On March 29 a cold-wave warning was ordered for Winnemucca. The temperature fell 36° in twenty-four hours, reaching a minimum of 4°. Frost warnings were issued for the interior of California on March 29 and 30.—*A. G. McAdie, Professor and District Forecaster.*

RIVERS AND FLOODS.

There was but one flood period during the month. It was due to the general rains and moderating temperature from the 19th to the 22d, inclusive, and the flood area extended from southern New England westward through the Hudson and Susquehanna watersheds into the Ohio River as far west as the mouth of the Big Sandy River. In the Pittsburg district the flood attained serious proportions. At Pittsburg the maximum stage reached was 29 feet, 7 feet above the danger line, on the 22d. A stage of about 31 feet had been anticipated, and its failure to materialize can doubtless be attributed to the deficient flood volume from the Monongahela, whose watershed had been practically denuded of snow.

Warnings of this flood were first issued on the 18th, and frequently thereafter until all danger had passed. Warnings were also issued for points as far down as the mouth of the Big Sandy River, and stages above the danger line were recorded as follows: Beaver Dam, Pa., 39.1 feet, 14.1 feet above; Wheeling, W. Va., 42.9 feet, 6.9 feet above; Parkersburg, W. Va., 42.4 feet, 6.4 feet above; and Point Pleasant, W. Va., 44.1 feet, 5.1 feet above. Below Point Pleasant there was a great rise, but no danger-line stages were reached, except between Mount Vernon and Evansville, Ind., where the flood volume was augmented by the rise out of the Green River.

On Saturday, the 18th, the following general statement was telegraphed from the Central Office to stations in New York and eastern Pennsylvania:

High temperatures, with coming rain, will cause general thaw to-night and Sunday. Advisable to make preparations for movement of ice with rising rivers. Colder Monday.

The events of the next few days were in keeping with the forecast. Rains, with high temperatures, prevailed, and the

ice broke and moved out with rapidly-rising waters. Danger-line stages were passed in some places, particularly along the North and West Branches of the Susquehanna, but no damage of consequence was reported, except along the upper portion of the North Branch of the Susquehanna, where there was some flooding of bottom lands and cellars.

There was also a rapid rise in the lower Connecticut River during the last few days of the month. At Hartford, on the 31st, the stage of the river was 22 feet, 9 feet above the danger line, and Commerce street, the lower end of State street, and portions of East Hartford were flooded.

During the last week of the month opportunity was afforded for a very successful trial of the new river and flood service along the Grand River of Michigan. There was a moderate flood from the 25th to the 29th, inclusive, with a crest stage of about one foot above the danger line of eleven feet at Grand Rapids. Warnings of the flood were issued well in advance of its coming, and the new service was at once established in the popular confidence.

CLIMATE AND CROP SERVICE.

By MR. JAMES BERRY, Chief of Climate and Crop Division.

The following summaries relating to the general weather and crop conditions during March are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

Alabama.—Warm and favorable for work. Rainfall deficient, except in extreme southwest, where it was excessive. Much upland corn planted, some up by close of month, when gardening was well advanced. Considerable cotton land prepared and a little cotton planted. Wheat improved. Fall oats proved a failure, though an increased acreage of spring oats did well. February freeze killed one-third of the peach buds, otherwise fruit prospect continued good, nearly all varieties in bloom by 25th.—*F. P. Chaffee.*

Arizona.—Excessive precipitation during the first two decades. Heavy snowfall in northern and high altitudes of southern section 8th to 20th, melted rapidly after the 23d, causing floods, which destroyed considerable property. Weather favorable for farming operations last decade, except in northern counties, where the ground was too wet for plowing. First alfalfa cut on the 27th. Wheat and barley heading, thriving well. Stock fat. Ranges good. Feed and water plentiful. Desert lands covered with grass, weeds, and flowering plants two to five feet in height.—*L. N. Jesunofsky.*

Arkansas.—The temperature was above normal and there was ample moisture. Considerable progress was made in spring plowing. Some corn and potatoes were planted, and oats sown, and in favored sections potatoes and oats were beginning to come up to good stands. Severe cold during the winter injured peach trees materially in the northern portion of the State; in other sections the injury was slight; other fruit trees wintered nicely. Apple, peach, and plum trees, and strawberries blossomed last of month.—*Edward B. Richards.*

California.—Abnormally high temperature prevailed during the first half of the month, and the precipitation was above the average, especially in the south, where phenomenal rains occurred. No material damage to crops resulted from the unusual heat and heavy rain, but severe frosts on the 30th and 31st caused slight injury to early deciduous fruits in some sections. In many places the fruit was too far advanced to be damaged by frost.—*Alexander G. McAdie.*

Colorado.—The weather was generally mild, with an abundance of moisture. Plowing was pushed in north-central and eastern counties, but in southern and western counties work was delayed by wetness of the soil. On an average one-half the area to be cultivated was ready, and seeding and planting under way. Except in the north-central and northeastern counties, the season was late. Wheat came through the winter in good condition. In parts of Custer, Delta, Mesa, and Garfield counties peach, apricot, and cherry trees were injured by the severe cold of February, but the extent of damage can not now be estimated.—*F. H. Brandenburg.*

Florida.—The month was warmer and wetter than the normal. Work was pushed to advantage, the bulk of the corn crop having been planted, and a goodly acreage to cotton. The stands were generally good. The vegetable crop was somewhat backward, owing to the cold of winter; shipments, however, began to increase during the last decade. Cane advanced very well. Citrus trees protected during the winter showed more bloom than trees not protected.—*A. J. Mitchell.*

Georgia.—March weather was favorable to farming operations; temperature considerably above normal, freezing and killing frosts confined

The ice had entirely disappeared from the rivers by the end of the month except in New England. Reports from all districts affected indicate that the ice passed out quietly, with very little gorging and resultant damage. No ice was seen at Cairo, either in the Mississippi or Ohio, after the 3d, and at Kansas City there was none after the 4th. Navigation on the Mississippi was resumed as far north as Dubuque by the 28th, while below St. Louis it began with the disappearance of the ice on the 3d.

The highest and lowest water, mean stage, and monthly range at 291 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfeld, Professor.*

to northern section; rainfall far below normal, except in southern section, but generally sufficient for agricultural needs. Farmers behind with work in some sections. Corn planting was progressing over State last of month, nearing completion in south; cotton planting begun in northern, making satisfactory headway in southern half. Wheat, oats, and rye promising; oats irregular in some sections. Fruit crop generally excellent; peaches scarce in scattered sections.—*J. B. Marbury.*

Idaho.—First half of month warm and bright; latter part much cooler, with frequent high winds, rains, and snows, and some sleet and hail. Fall sown grain, hay crops, fruit trees, and shrubs wintered in excellent condition. Farm work progressed rapidly during the month. A large acreage was prepared for sugar beets. Stock was in good condition; some cattle and sheep were turned out to summer ranges.—*Edward L. Wells.*

Illinois.—The weather during the month was of marked clemency and very favorable for farming operations. Plowing and seeding, as compared with last year, were advanced three or four weeks. At the end of the month the sowing of oats in the central district was well under way or finished, and plowing was well advanced in other districts. Wheat was exceptionally promising, the plant being vigorous and well stooled. Peaches showed great injury, but other fruits were mostly promising.—*William G. Burns.*

Indiana.—The weather, especially during the latter half of the month, was exceptionally mild and favorable to farming interests. During the last week sowing oats, planting potatoes, and making gardens were in progress. Wheat was never in better condition or more promising at the last of March. Rye, clover, and meadows were also doing well. Budded peaches in some orchards were reported killed, but generally fruit of all kinds was alive.—*W. T. Blythe.*

Iowa.—Except about a week in the second decade, March was phenomenally warm. The ground thawed rapidly and the surface was generally dry enough for field work after the 20th. Spring wheat seeding was nearly completed and oats and barley seeding begun before April 1. Plowing sod ground for corn was in progress. Fall wheat, rye, and clover wintered well and grass was unusually green at the close of the month. Fruit buds showed no damage. Live stock was healthy.—*John R. Sage.*

Kansas.—Wheat was in good condition and growing. Oat and barley sowing progressed, and oats, barley, and spring wheat were coming up. Alfalfa and tame grass were growing well; wild grass was starting. Potatoes were being planted, some coming up. Ground fine; plowing progressing. Corn planting begun. Apricots blooming in the south; peaches killed; apples safe. Farm work well advanced.—*T. B. Jennings.*

Kentucky.—Season early; weather favorable, conditions unusually favorable. Winter wheat looking well and never more promising, except in east portion. Tobacco beds sown and some plants coming up. Stock poor in some instances, but improving. Some scarcity of feed, but grass and pastures doing well. Oats being sown, potatoes planted, gardens begun, and plowing done for corn, but none planted. Fruit blooming and good prospects for crop, except that peaches were killed in some localities.—*F. J. Walz.*

Louisiana.—Moderate temperatures during the month were favorable for agricultural interests, but frequent rains interfered with farming operations. Very little land had been prepared for cotton. Corn planting was pushed forward as rapidly as possible. In some places the bulk of the crop had been planted, while in others planting had barely commenced. Some corn was planted in unbroken ground. Sugar cane planting progressed slowly; seed cane was in good condition. Preparations for